Claims

1. A force or pressure sensor, comprising a substantially rigid, mechanical-load resistant frame (1), a flexible diaphragm (2) secured over its peripheral rim to the frame (1), and a piezoelectric sensor diaphragm (3) applied to the surface of the flexible diaphragm (2), **characterized** in that the sensor diaphragm (3) loading element comprises a substantially rigid cover (4) capable of carrying mechanical loading of more than 50 kg, preferably more than 100 kg, that the cover (4) has a protrusion or shoulder (4a), bearing against a middle section of the flexible diaphragm (2) and thus, by deflection, prestressing the flexible diaphragm (2) and the piezoelectric sensor diaphragm (3) attached thereto, and that the frame (1) and the cover (4) define therebetween a closed housing chamber, the flexible diaphragm (2) and the piezoelectric sensor diaphragm (3) being located thereinside.

2. A sensor as set forth in claim 1, **characterized** in that the frame (1), the cover (4), and the diaphragms (2, 3) are rotationally symmetrical relative to the cover protrusion or shoulder (4a).

3. A sensor as set forth in claim 1 or 2, **characterized** in that the flexible diaphragm (2) comprises a thin metal diaphragm, having its peripheral rim secured between the edges of the frame (1) and the cover (4).

4. A sensor as set forth in any of claims 1-3, **characterized** in that the sensor diaphragm (3) comprises a piezoceramic diaphragm, having a diameter smaller than that of the metal diaphragm (2), and that the sensor diaphragm (3) has its peripheral rim at a distance from the inner periphery of the housing chamber.

5. A sensor as set forth in any of claims 1-4, **characterized** in that a sensor-signal transmitting contact spring (5) is in contact with the sensor diaphragm (3) opposite to the cover protrusion or shoulder (4a).

6. A force or pressure sensor as set forth in any of claims 1-5, **characterized** in that an amplifier (6) and its circuit board (7) are located in said housing chamber.

7. A sensor as set forth in any of claims 1-6, **characterized** in that the frame (1) and the cover (4) comprise elements in the shape of bodies of revolution.

8. A sensor as set forth in any of claims 1-7, **characterized** in that the sensor has a responsivity, such that the sensor provides an output signal when the change of a load applied to the cover (4) is less than 10^{-6}, preferably less than 10^{-9} x load rating of the cover (4).

9. A sensor as set forth in any of claims 5-8, **characterized** in that the amplifier (6) has its input impedance matched to provide a desired settling time, during which the amplifier (6) has its output set substantially to zero, while the loading applied to the cover (4) respectively remains essentially unchanged.

10. A sensor as set forth in any of claims 1-9, **characterized** in that the closed housing chamber is hermetically sealed.

11. A sensor as set forth in any of claims 1-10, **characterized** in that the cover (4) is provided with an adapter element (10, 11), which enables loading of the cover with changes in a fluid or gas pressure.

12. A method for applying a force or pressure sensor as set forth in any of claims 1-11, **characterized** in that one or more sensors (13) are disposed in contact with a bed (12), and a sleeping or lying person is measured for his or her heart rate and respiratory amplitude, as well as frequency.

13. A method as set forth in claim 12, **characterized** in that the measurement is implemented with one or more sensors (13) placed under a bed post or posts.

14. A method as set forth in claim 12, **characterized** in that the measurement is implemented with one or more sensors (13) placed in contact with a bed mattress (14, 15), especially between a top mattress (14) and an actual mattress (15), and the sensor is prevented from sinking in the top mattress and/or the mattress with panels (21, 22), which are more rigid than the mattresses and between which the sensor (13) is positioned.